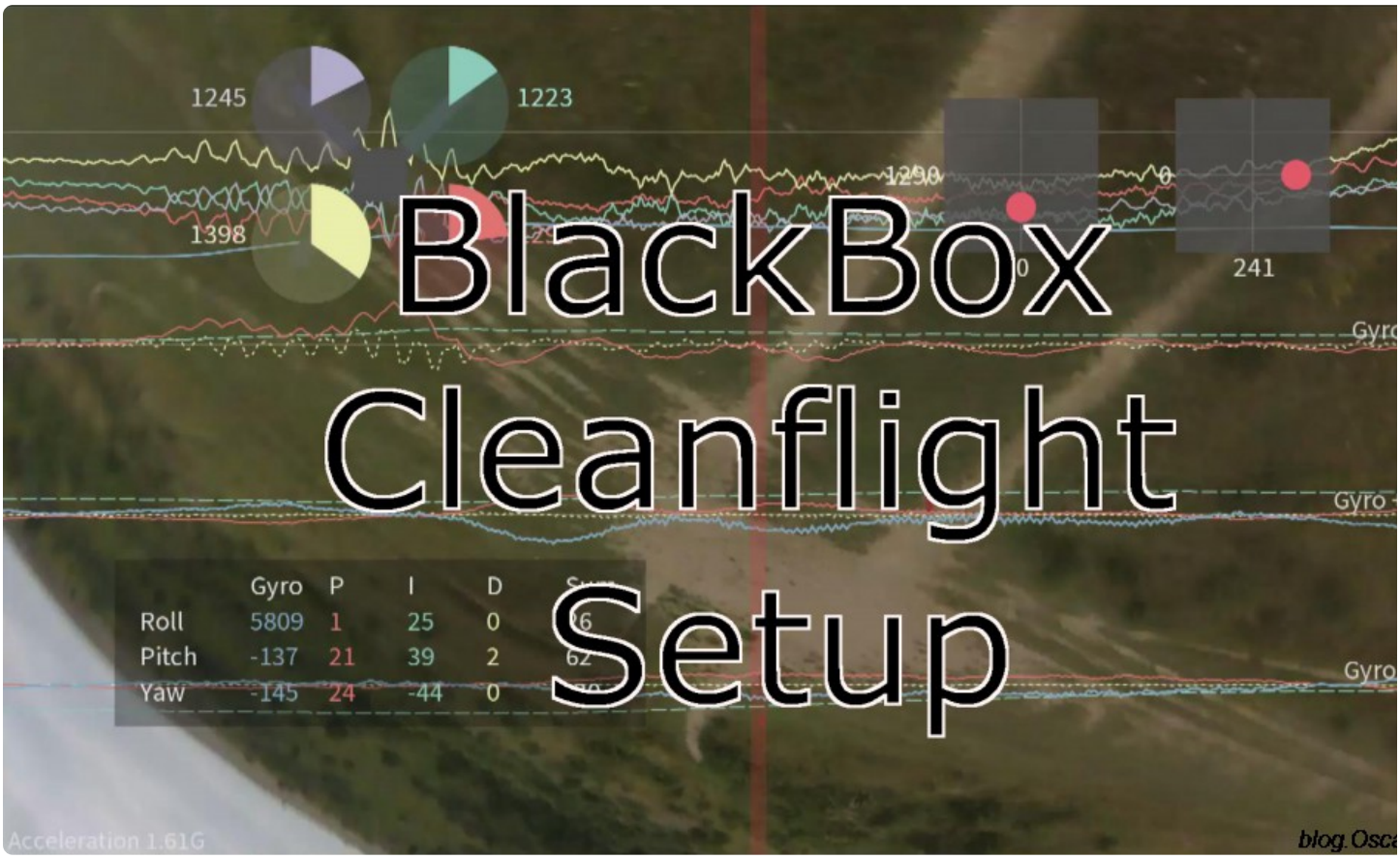
Setup Blackbox in Cleanflight

Published: 19th August 2015 | **Last Updated on** 21st June 2016



Blackbox feature in Cleanflight is useful for tuning PID, and diagnose any performance related issue y might have with your multicopter.

Free Browser Extension

Coupert Automatically Find And Apply Promo Codes At Checkout. Save at Thousands Stores. coupert.com

COUPON CODES AVAILABLE GET C

This is part of the Cleanflight Setup Guide. Here is a guide on how to tune your PID using blackbox log is a guide on how to overlay sticks movement and blackbox data onto your FPV video.

Content index:

- Using OpenLog

pends on what flight controller you have. For example ou can use for Blackbox, but the Naze32 Acro version ogger and a SD card.

ted, for 2MB you can only record about 3 or 4 mins of ger memory such as the SPRacing F3 board has 8MB g is, it's advertised as 64Mb – 64 Mega bit, not Mega B well.

I like using an external data logger, because it's relatively cheap to setup, and you can record for much with an micro SD card.

bout $9, the cheapest I can find on the internet.

peed. *Sandisk Extreme 16GB Class 10 UHS-I microSI*

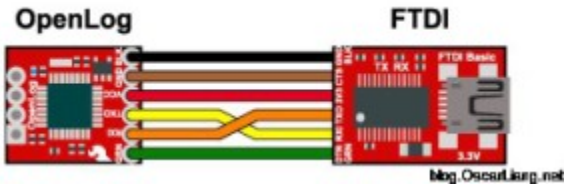
t i found *Sandisk Ultra class 10 16GB* also works fine

- It's pretty cheap to setup and running
- More than enough data storage

u can use the same hardware on all of your boards that don't have onboard flash storage

The OpenLog custom firmware for blackbox. Instruction is pretty clear.

You can either use a dedicated FTDI programmer, or an Arduino Uno.



ger to the Arduino UNO, or Sparkfun FTDI programmer

Problem: Error when Flashing firmware on OpenLog

compatible with the “Arduino Pro or Pro Mini 5V/16MHz w/ ATmega328”

If you’re not sure, try both, it won’t hurt anything.

Problem: Getting Gibberish in the log files

If you are getting bad log files, make sure you compile the Blackbox sketch for the Atmega328 5v 16M and not the 8Mhz.

Format your SD card

It’s recommended to format your Micro SD card with this tool.

For 2GB or more, you should use FAT32 format. Smaller cards can use FAT (aka FAT16).

on the SD card. You need to create a config file on the

.TXT

horeRX

To enable blackbox feature check this option:

blackbox-feature-in-cleanflight-configurator

vely you can do it in CLI command by entering

Connection with Naze32

You will only need 4 connections, TX, RX, 5V and GND. I get the 5V and GND from the spare motor pi

I strongly recommend using Radio pin3 (TX) and pin4 (RX) on the Naze32 board to connect to the Op These pins are UART2 serial ports, and they are available when you are running PPM on RX.

In fact you only need to connect the TX pin on the Naze32, because the communication is one way, da only sent from Naze to OpenLog, and no data is required to send back to the FC.

cleanflight-port-tab-data-blackbox-uart2

I would not recommend running Openlog with UART1 (TX/RX pins in the middle of the board), becaus s case. Once you change that baud rate you won't be i am wrong!)

g automatically. The Blue LED on the OpenLog shoul

ne

/ 2400ms ~= 416 iterations of control loop data to reco 1200 on a Naze32 board, and we have twice as man iterations (833 to be exact). And that's a lot of data!

If your hardware is not good enough (e.g. low grade SD card), the logging device will struggle with writ ou will find missing data in your graphs like this.

You can halve the sampling rate by setting “rate_denom” to 2.

```
set blackbox_rate_denom = 2
```

Using Onboard DataFlash Memory

The advantage of using integrated flash storage is:

- No need to worry about OpenLog and SD card
- Doesn’t lose data due to writing error
- Free up a serial port for something else

ng the feature, or type in this command in CLI commar

an export it by going to DataFlash tab, and press “Save

nds of data on the Full Naze32 board @ 1200 looptime

This is a quick Chrome application that you can use to overlay blackbox data on a MP4 video. There is rendering wait, so it’s perfect for quick check.

r you can output it as a WEBM file, but cannot output it as a normal video file. WEBM isn’t sup

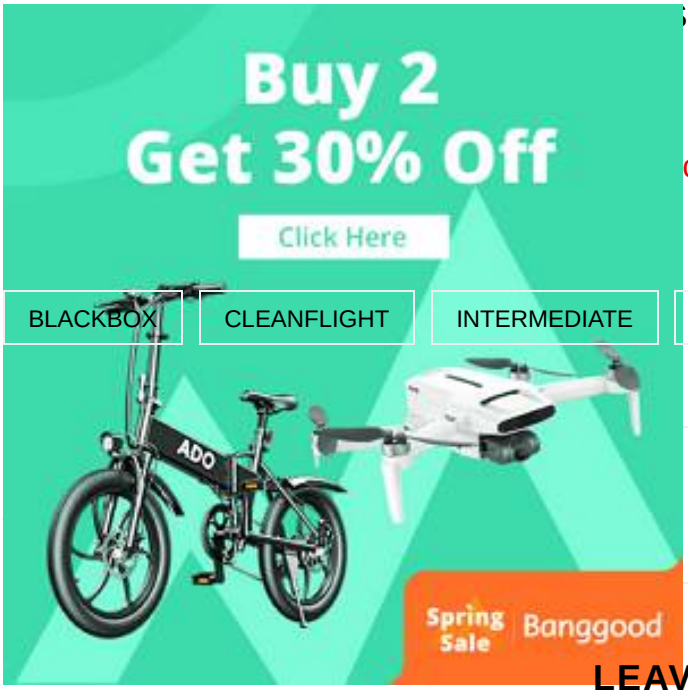
This blackbox convert and render tool only works in command lines, it doesn't have an interface. Follo instructions it's pretty straight-forward.

blackbox-convert-render-tool-command-line-example

It basically can convert your log data into a series of PNG pictures, pretty much like time lapse photos. can then convert these photos in your video editor into a single video that you can overlay on your fligh footage.

How I mount Openlog on my mini quad

It's fitted under the top plate of the frame with zip tie, a layer of Velcro to stop it from sliding. Note that SD card from accidentally popping out in hard landing c



ckbox

BLACKBOX CLEANFLIGHT INTERMEDIATE MULTICOPTER

r

Drone Lab LiPo 4S 1500mah Battery

LEAVE A COMMENT

Your Comment

for moderation before appearing.

SUBMIT

51 COMMENTS

CHUPO_CRO

7th September 2019 - 11:39 pm

You mean 416 iterations per second is around 2400 µs, not ms.

nt to use it to tune a micro scisky and a qx70 board on
l seem to burn out motors (they become stiff to turn by
locked in.
? On the scisky uart 2 (front right) with the connector is
is the msp, sounds like I could share that? Am I corre
that line off the chip before the usb driver?
access the other uarts. Do you know where the other

Thank you!

Bryan

YANN

in UART2 ?

I want to keep UART1 for a Micro minimOSD.

Anybody tried this yet ?

OSCAR

17th July 2016 - 3:38 pm

no you can't… one UART can only be used for one thing…

however you could use PPM while tuning your quad with Blackbox… after that rep

PPM with SBUS again maybe?

PETER KORNUM

think is a defektive ESC? and will it tell me witch one c

.com/168044887

UART1 at 250 kBaud, with MSP at the default of 115.2

OSCAR

8th February 2016 - 12:16 am

3rd February 2016 - 8:35 am

Hi,

I got the OpenLog serial data logger you suggest from banggood:
banggood.com/OpenLog-Serial-Data-Logger-9660bps-PPZ-Flight-Control-Record-FAT16-F
MicroSD-Cards-p-993844.html
But not the Sparkfun FTDI Programmer you suggested. I instead got it from banggood (che
and has a 3.3 / 5v switch instead of a soldering point):
banggood.com/FTDI-Basic-Program-Downloader-USB-TTL-3_3-5V-FT232-For-Arduino-
p-988937.html
I hope it works (I'm pretty new to this). I'll let you know when I receive it in a couple of week
Thanks for the tutorial.
Cheers

s a spare CC3D board to use at the moment. I have fl
9 I believe. I'm trying to setup blackbox for use with th

blackbox_device = SPIFLASH" the CLI prompt return
ed to input "set blackbox_device = SERIAL" just for fur
o you possibly know how to fix this? Thanks!

OSCAR

20th January 2016 - 11:02 am

Flash it with cleanflight 1.10 :) (or just latest version)

Trying to upload the OpenLog custom firmware by following your instructions, but I'm a bit
depth here. I am using a generic FTDI programmer and OpenLog I ordered recently from
Banggood. I connected the 6 wires from the programmer to the OpenLog, 2 crossed over e
as in your diagram. Chose the following options in the Arduino "Tools" menu:
Board: Arduino/Genuino Uno
Port: dev/cu.usbserial-BLAHBLAH
Programmer: USBasp (you don't mention this one. Does this matter?)
When I click the "Upload" button, it compiles, but with 3 similar warnings in red, which inclu
text:
warning: '__progmem__' attribute ignored [-Wattributes]
Then it gives some information about memory usage. Then it tries 10 times to sync someth
gives a similar error to the one you mentioned above, that you fixed by choosing "Arduino F

id, I get all the same errors, plus more that complain th

it matter what I choose for "Programmer"? Thanks for

rter kit (was wanting one anyway) and tried to do it tha
o Rx as your diagram shows – seems weird but nobod
corrected that so I went with it.
I had to remove the Tx/Rx connections to get the sketch to upload without error (as
remember reading was necessary elsewhere). Then I plugged them back in and re

There are also several log files with names like LOG00119.TXT that look like gibbe
Does that mean the update succeeded?
(Should we be asking these things in your new forum instead?)

ANDREI

21st January 2016 - 9:23 am

Hi Oscar, sorry to spam up your post with these annoying problems. You c
delete them if you wish. Having said that…
I GOT IT WORKING!!! :D
Arduino Uno worked without a hitch and I have recorded my first logs, syn
video and exported combined video. It is awesome. I discovered that my c
term is quite active with the default PIDs on 2Khz mo
illation on P, but the graphs look pretty good overall. S
happening. Thanks for your guide!

y 2016 - 8:07 pm

etting me now…
would really appreciate it if you could post your questio
http://intoFPV.com … I only check my blog comments
use the forum everyday!

SAMMY

3rd January 2016 - 10:22 pm

Can I use the logger when I'm already running a SBUS receiver in UART2 (pin4)? Can I jus

6th January 2016 - 12:58 pm

yea if you have a F3 FC, you can use UART3 for Blackbox :)

SAMMY

18th January 2016 - 9:17 pm

But on a Naze it's a no go? I gotta switch to a PPM RX for it to work?

RUSSELL HOLT

6th June 2016 - 4:24 am

i thought UART3 only supplied 3vdc? I also thought that SBUS uses UAR
therefore OpenLog could not be hooked up to it?
o know. i have GPS, OSD & OpenLog hooked up, but
PPM, giving me only 8 channels with my FrSky XSR
be using SBUS and have the 16 channels available.
rings, FL.

016 - 2:44 pm

ou get the 3V idea from? it should be 5V…

21st November 2015 - 11:18 am

Hey Oscar,

I love your blog, your articles have been of so much help in building and setting up my qua

OSCAR

24th November 2015 - 5:44 pm

can you find a 8-legged chip on board? i just looked up flip32 v2.5 and there isn't c

COLBY

17th November 2015 - 1:43 am

Hey Oscar,

Thanks for this great article! I tried using the blackbox on my dodo flight controller, but it do seem to be storing any more than a couple seconds of flight time. I tried wiping the data an did not help. Have you encountered this?

sounds like a hardware fault?

5:33 am

The DODO only has a 2mb onboard memory for the blackbox recording.

You can try this though if you are not running and external blackbox.

Go into CLI and enter

OSCAR

6th January 2016 - 10:54 am

you need highest resolution recording to get to see all the noise i
PID and gyro traces :)

MIKE

31st October 2015 - 9:12 am

Sorry, but this sentence is wrong. The ports should be reversed. Otherwise, great write up.
I strongly recommend using Radio pin3 (RX) and pin4 (TX) on the Naze32 board to connec
Openlog.

Rev3 Naze32 manual extract too:
ed, channels 3 and 4 are are used for 3.3V GPS conne
ceiver, these are normally unused, with standard recei
THR to 5, RUD to 6, and AUX1/2 to channels 7 and 8.

Hi Oscar
Was the sync issue the only problem you had while uploading?
Ive been getting ‘avrdude: verification error; content mismatch’ all day and can’t seem to fig

12th October 2015 - 11:39 am

Hi Zac, i didn't have this error.. and tried on both Arduino UNO and an dedicated F programmer, both worked fine…
Not sure what Arduino IDE you are using, maybe tried the 1.0.5 version? (which w I am using)
also try a different FTDI programmer?
thanks
Oscar

SMOOTHFPV

9th October 2015 - 4:41 am

blog. For the Naze connection, you only really need 3
e's no bidirectional data flows because OpenLog only
card. There's no reason for the OpenLog to talk back
an omit the TX out from the logger.

, when i tested it and confirm it's working i will update t

8th October 2015 - 12:48 am

Hi Oscar,
Whats the best way to get more data when using the onboard flash memory on the Naze F

By default “blackbox_rate_denom” is 1, so you get full resolution of the flight data.

GEGGOG

14th September 2015 - 1:50 pm

Great article Oscar, especially so the point of selecting the Arduino Pro Mini for uploading t sketch – this had me truly stumped.

I’ve now got this up and running, albeit with one small issue. I can see that the data is bein logged to the OpenLog correctly (I can eject the card and read it on my laptop via an SD ca adapter), but for some reason when I attempt to read the data via CleanFlight configurator (Dataflash screen) I’m told that “Your flight controller does not have a compatible dataflash available.”

the MicroSD card via the Dataflash screen? Or is this rd the flight computer? Any assistance you could prov

to pins 3/4 with UART2 configured to 255000 baud as

d SD card, you can only read the data by taking out th ard adpater.

You cannot read it via Cleanflight configurator, that’s only for onboard Dataflash m which is only available on Naze32 full, or CC3D…

5th September 2015 - 8:32 pm

Hi Oscar,

I was wondering, Is it possible to run both the micro minim osd and the black box at the sar time?

Thanks for the post btw, helps a lot!

OSCAR

7th September 2015 - 12:37 pm

Hi Ricardo, yes it is, that's what i am running on my Evo250, MinimOSD on UART1 Blackbox on UART2.

but you need to unplug minimOSD TX/RX from FC when connecting to cleanflight,

9:45 pm

king today although I have a new question: Why do you 0k in the settings at Cleanflight? I saw that the baud rat rom the blackbox and it is working fine. Any particular

uad flies ok out of the box with standard settings but h puch outs. Wish me luck haha.

OSCAR

16th September 2015 - 3:35 pm

3rd September 2015 - 10:50 am

So I cannot use sbus because I have to use uart2 serial for rx.

Do I change my reciver to cppm?

Thank you.

OSCAR

3rd September 2015 - 5:08 pm

yea you can do that, you can go back to SBUS on UART2 after you tune your qua
blackbox.

KEVIN YANG

:19 am

help!

error in firmware.(It works Epprom clean)

ino book. maybe check the library but I cannot find in

:16 am

oile. I just did compile all safely. Thank you for your inf

KEVIN YANG

4th September 2015 - 9:41 am

Thank you very much Oscar!

OSCAR

30th August 2015 - 5:40 pm

Yes that's coming soon!

IAN

22nd August 2015 - 6:24 am

Hi Oscar,

The photo showing the connections from Arduino One board to OpenLog board shows Tx connected to Tx and Rx to Rx? Shouldn't it be Tx to Rx and Rx to Tx? When run the Serial Hello World it works the latter way.

rogram from Aurduino board. When I compile and up
e to a new log file. It's not modifying the firmware, eve

firmware for blackbox?

ect board in Arduino IDE as I pointed out?

d rate in the config file on the SD card? are you using t
ght?

BLACKMENNEWSTYLE

19th August 2015 - 5:50 pm

Very nice tutorial by the way :)

Thanks for sharing!

OSCAR

20th August 2015 - 10:05 am

haha yes they are, but they are doing it for free so can't blame them!

I will look into FFMpeg! thanks! It would make life so much easier :)

Oscar Liang © 2021 - All Right Reserved.